# Space Weather Forecast

Issued on Friday, 16 February 2024 at 13:18 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Isolated Moderate flares likely and a chance of Strong flares. Likely chance for S1/Minor Solar radiation storms Day 1**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity has been High, with a Strong flare observed from a large and complex region on the southwestern limb. Two Moderate flares were also observed from this region. This is one of ten regions on the visible disc. A weakening region in the west of the northwest quadrant, and a developing region a little further east in the northwest are the only other regions of note. The remaining regions are all weak or stable, although a couple of newly developing regions will continue to be monitored for further evolution.

A couple of possible Earth-directed coronal mass ejections (CME) were observed in the past 24hrs. The first as a result of a filament liftoff in the north, and a second in association with the Strong flare mentioned above. Both of these are awaiting further imagery to be fully analysed.

**Solar Wind / Geomagnetic Activity:** Solar winds are at slightly elevated levels. Total interplanetary magnetic field (IMF) strength has been at weak levels, with the north-south component also varying weakly. Geomagnetic activity was Quiet (Kp 0 to 1).

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) was below the Minor Radiation storm threshold, although a recent rise and subsequent levelling out was observed in response to the Strong flare mentioned above.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Moderate activity is expected with a likelihood of Moderate-class flares and a chance of Strong-class flares.

**Solar Wind / Geomagnetic Activity:** Two possible Earth-directed CMEs occurred, with full analysis awaiting more complete imagery. An early estimate is for a glancing blow CME(s) on Day 3 (18 Feb). Solar winds are at slightly elevated levels, and are expected to decline towards ambient levels through the coming days. No fast wind enhancements are expected, with all possible sources appearing weak. Quiet geomagnetic activity is expected to continue at first, with Day 3 possibly seeing a rise to Active-Minor Storm levels if any CMEs arrive.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is forecast to begin to decline towards background levels in the absence of any further sources of radiation storms, although a complex region in the southwest quadrant still presents a limited risk.

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**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 1 | 5 | 15 | 5 |
| Strong | G3 | No | 1 | 1 | 1 | 1 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | Yes | 70 | 70 | 60 | 50 |
| Very Active | R3 to R5 X | Yes | 25 | 15 | 10 | 10 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 70 | 30 | 15 | 10 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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